AMENDMENTS TO THE CLAIMS

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please CANCEL claims 2, 3, and 7 without prejudice or disclaimer. Please AMEND claims 1, 4, 5, 8, 9, and 11 to read as follows:

1. (CURRENTLY AMENDED) A brightness control apparatus, comprising:

a probability density function calculator to calculate a probability density function based on pixel values of respective pixels of an input image signal;

a first setter to set a first upper limit value and a first lower limit value with respect to the pixel values over a first predetermined level in the probability density function;

a second setter to set a second upper limit value and a second lower limit value for the pixel values over a second predetermined level in the probability density function;

a third setter to set an upper limit value and a lower limit value for a range of pixel values not covered by either the first setter or the second setter; and

a brightness value controller to calculate a cumulative distribution function for the probability density function controlled by the first upper limit value and the first lower limit value set by the first setter, and to calculate brightness levels corresponding to the input image signal based on the calculated cumulative distribution function,

wherein the second setter outputs the probability density function controlled by the set second upper limit value and the second lower limit value to the brightness value controller, and

wherein a mapping function calculator converts the cumulative distribution function into a mapping function for the brightness levels using a formula as follows:

$$G(K) = CDF'(K) \times \frac{\text{Maximum Luminance}}{\text{Number of total image signal pixels}}$$

G(K) denoting a mapping function, and CDF'(K) denoting a compensated cumulative distribution function.

2. (CANCELLED)

3. (CANCELLED)

4. (CURRENTLY AMENDED) ~~The brightness control apparatus of claim 3~~A brightness control apparatus, comprising:

a probability density function calculator to calculate a probability density function based on pixel values of respective pixels of an input image signal;

a first setter to set a first upper limit value and a first lower limit value with respect to the pixel values over a first predetermined level in the probability density function;

a second setter to set a second upper limit value and a second lower limit value for the pixel values over a second predetermined level in the probability density function;

a third setter to set an upper limit value and a lower limit value for a range of pixel values not covered by either the first setter or the second setter; and

a brightness value controller to calculate a cumulative distribution function for the probability density function controlled by the first upper limit value and the first lower limit value set by the first setter, and to calculate brightness levels corresponding to the input image signal based on the calculated cumulative distribution function,

wherein the second setter outputs the probability density function controlled by the set second upper limit value and the second lower limit value to the brightness value controller, and

wherein the brightness value controller ~~comprises~~includes:

a Bin Underflow Bin Overflow to adjust the probability density function according to the upper value limits and the lower value limits set by the first setter, the second setter, and the third setter, respectively;

a cumulative distribution function calculator to calculate the cumulative distribution function with respect to the adjusted probability density function;

a cumulative distribution function compensator to compensate the calculated cumulative distribution function so that a maximum value of the function becomes a total number of pixels of the input image signal;

a mapping function calculator to convert the cumulative distribution function into a mapping function for brightness levels; and

a mapper to convert the pixel values of the input image signal according to the mapping function.

5. (CURRENTLY AMENDED) The brightness control apparatus of ~~claim 3~~claim 1, wherein the cumulative distribution function calculator calculates the cumulative distribution function using a formula as follows:

$$CDF(K) = \sum_{t=0}^{k} PDF(t)$$

where, CDF(K) denotes a cumulative distribution function, PDF(t) is the probability density function, and k is a maximum pixel value.

6. (ORIGINAL) The brightness control apparatus of claim 4, wherein the cumulative distribution function compensator compensates the calculated cumulative distribution function such that a maximum pixel value of the function becomes a total number of pixels of the input image signal using a formula as follows:

$$CPF'(K) = CDF(K) - \frac{CDF(N-1)}{N-1}K + F(K),$$

where, CDF'(K) denotes a compensated cumulative distribution function, CDF(K) is the cumulative distribution function before compensation, F(K)= (the total number of pixels of an image signal/(N-1))K, N-1 is the maximum pixel value, and CDF(N-1) is the cumulative distribution function value at the maximum pixel value.

7. (CANCELLED)

8. (CURRENTLY AMENDED) The brightness control apparatus of claim 1, wherein the pixel value ~~is comprises~~ includes the brightness value, a grayscale value of three primary colors R, G, and B, and/or a grayscale value of color difference signals Y, Cb, and Cr.

9. (CURRENTLY AMENDED) A brightness level stretching method, comprising ~~the steps of~~:

calculating a probability density function based on pixel values of respective pixels of an input image signal;

setting a first upper limit value and a first lower limit value with respect to pixel values which are equal to or smaller than a first predetermined level in the probability density function;

setting a second upper limit value and a second lower limit value with respect to pixel values over a second predetermined level in the probability density function;

setting an upper limit value and a lower limit value for a range of pixel values not covered in either the first setting or the second setting;

calculating a cumulative distribution function for the probability density function controlled by the set first upper limit value and the set first lower limit value; and

calculating brightness levels corresponding to the input image signal based on the calculated cumulative distribution function by adjusting the probability density function according to the first, second and third upper value limits and the first, second and third lower value limits.

10. (ORIGINAL) The brightness level stretching method of claim 9, further comprising setting a second upper limit value and a second lower limit value with respect to pixel values which are over a second predetermined level in the probability density function.

11. (CURRENTLY AMENDED) ~~The brightness level stretching method of claim 9~~A brightness level stretching method, comprising the steps of:

calculating a probability density function based on pixel values of respective pixels of an input image signal;

setting a first upper limit value and a first lower limit value with respect to pixel values which are equal to or smaller than a first predetermined level in the probability density function;

calculating a cumulative distribution function for the probability density function controlled by the set first upper limit value and the set first lower limit value;

and calculating brightness levels corresponding to the input image signal based on the calculated cumulative distribution function,

wherein the step for calculating the brightness levels ~~comprises~~includes:

adjusting the probability density function according to the first upper limit value, the first lower limit value, ~~the~~ a second upper limit value, and ~~the~~ a second lower limit value;

calculating a cumulative distribution function with respect to the adjusted probability density function;

compensating the calculated cumulative distribution function sequentially so that a maximum pixel value of the function becomes a total number of the pixels of the input image signal;

converting the cumulative distribution function into a mapping function for brightness levels; and

mapping the input image signal using the mapping function.

12. (ORIGINAL) The brightness level stretching method of claim 11, wherein the step for calculating the cumulative distribution function calculates the cumulative distribution function using a formula as follows:

$$CDF(K) = \sum_{t=0}^{k} PDF(t),$$

where, CDF(K) denotes the cumulative distribution function, PDF(t) is the probability density function, and k is the maximum pixel value.

13. (ORIGINAL) The brightness level stretching method of claim 11, wherein compensating the calculated cumulative distribution function comprises compensating the calculated cumulative distribution function using a formula as follows:

$$CPF'(K) = CDF(K) - \frac{CDF(N-1)}{N-1}K + F(K),$$

where, CDF'(K) denotes a compensated cumulative distribution function, CDF(K) is the cumulative distribution function before compensation, F(K)= (the total number of pixels of an image signal/(N-1))K, N-1 is the maximum pixel value, and CDF(N-1) is the cumulative distribution function value at the maximum pixel value.

14. (ORIGINAL) The brightness level stretching method of claim 11, converting the cumulative distribution function into a mapping function comprises using a formula as follows:

$$G(K) = CDF'(K) \times \frac{\text{Maximum Luminance}}{\text{Number of total image signal pixels}}$$

where G(K) denotes the mapping function, and CDF'(K) denotes the compensated cumulative distribution function.

15. (ORIGINAL) The brightness level stretching method of claim 9, wherein the pixel value comprises the brightness value, a grayscale value of three primary colors R, G, and B, and/or a grayscale value of color difference signals Y, Cb, and Cr.